REMARKS

Claims 1-20 are pending in the application. No claims are amended herein.

Applicants acknowledge with appreciation the indication that claim 8 would be allowable if rewritten in independent format. However, because Applicants consider that all of the presently pending claims are allowable, for the reasons set forth herein, claim 8 has not been amended into independent format.

The paragraph on page 1, referencing the parent application has been amended to insert the patent number and issue date of the parent application.

For the reasons set forth below, Applicants respectfully request reconsideration of the application, withdrawal of the asserted rejections of Applicants' claims, and allowance of all presently pending claims.

Rejection of Claims 1-7 and 9-20 under 35 U.S.C. § 103(a)

Claims 1-7 and 9-20 stand rejected as obvious over Ma et al., U.S. Patent No. 6,407,435 B1. Applicants respectfully traverse this rejection for at least the following reasons. Applicants respectfully request the Examiner to withdraw the rejection of these claims on this ground.

1. Ma et al. Fails to Disclose All the Features of Applicants' Claimed Invention.

As contended by the Examiner, Ma et al. disclose formation of alternating sub-layers comprising a first dielectric material and a second dielectric material.

As admitted by the Examiner, Ma et al. fails to disclose a composite dielectric layer as this element is defined in Applicants' specification and claims. The composite dielectric layer is an element of all pending claims. As disclosed in Applicants' specification, from page 9, line 29 to page 10, line 6, set forth here for convenience:

> The composite dielectric layer formed by annealing at a high temperature the layered dielectric structure includes a reaction product of the high-K dielectric material and the standard-K dielectric material. The reaction product is

> formed during the annealing of the alternating sub-layers of the first and second dielectric materials, at a high temperature. At the annealing temperature, the alternating sub-layers of dielectric materials combine or react with each other, at least at the interfaces of the alternating sub-layers, to form the composite dielectric layer which includes a reaction product of the dielectric materials of the respective sub-layers.

The reaction product is further described at page 16, lines 9-10, and the step of annealing to form the reaction product is described in detail from page 21, line 13 to page 24, line 2. Specific examples of the reaction product are shown in Figs. 1 and 7-9. Figs. 7-9 are described in detail from page 22, line 24 to page 23, line 16. The reaction product is shown in the drawings and referred to in the specification as the layer 110rp. As set forth in detail in the specification, the composite dielectric layer of the claimed invention includes a reaction product of the high-K dielectric material and the standard-K dielectric material, of which the first and second dielectric materials are comprised.

Thus, the composite dielectric layer described in detail and recited in Applicants' claims differs from the multi-layer dielectric stack disclosed by Ma et al. While Ma et al. disclose a multi-layer stack including repeating layers of, e.g., Al_2O_3/ZrO_2, Ma et al. fail to disclose that the materials of the respective repeating layers react with each other at any time. This multi-layer stack is clearly distinct from Applicants' composite dielectric layer. Ma et al. therefore fail to disclose all the limitations and features of Applicants' claims.

Failing to disclose all the limitations and features of Applicants' claimed invention, Ma et al. cannot have rendered obvious Applicants' claims. Therefore, Applicants' claimed invention patentably distinguishes over Ma et al., and the rejection of Applicants' claims over Ma et al. should be withdrawn.

2. Applicants' Claimed Invention is Not Inherently Obtained by Ma et al.

As contended by the Examiner, Ma et al. disclose formation of alternating sub-layers comprising a first dielectric material and a second dielectric material.

As admitted by the Examiner, Ma et al. fails to disclose, and also fails to suggest, the formation of a reaction product of the high-K dielectric materials to form a composite dielectric material as claimed.

The Examiner attempted to remedy this shortcoming in the disclosure of Ma et al. by contending that Ma et al. teaches a step which the Examiner contends corresponds to the annealing step taught by Applicants to form the claimed composite layer. In the Office action, the Examiner referred to the annealing step 550 disclosed by Ma et al., at col. 7, lines 20-28. However, Ma et al. discloses only that the annealing is "to condition the high-K layers and the interposing layers as well as the interfaces between the various layers and the interface with the underlying silicon." Ma et al. does not disclose or suggest that the annealing might result in the formation of a reaction product between the high-K layers and the interposing layers. Thus, the only support the Examiner was able to cite for the implicit but unstated contention that Ma et al. would *inherently* form the claimed composite dielectric layer is *Applicants' own specification.*

The Examiner's position is clearly erroneous and legally incorrect for the two reasons noted in italics above.

First, the Examiner's position relies upon Applicants' own disclosure to provide the disclosure missing from the reference but necessary to the Examiner's conclusion of the obviousness of Applicants' claimed invention. This is clearly improper and has no basis in law. Applicants' own discovery of the composite dielectric material formed by annealing the claimed alternating layers of high-K and standard-K dielectric materials at elevated temperatures is not evidence against Applicants in determining whether the prior art makes a case of *prima facie* obviousness. *In re Wertheim*, 191 USPQ 90, 102 (CCPA 1976) (applicant's own disclosures can not be used to support a rejection of the claims "absent some admission that matter disclosed in the

specification is in the prior art"); *In re Ruff*, 256 F.2d at 598, 118 USPQ at 347 ("The mere statement of this proposition reveals its fallaciousness").

Second, since the Examiner asserts that the subject matter missing from Ma et al. would be formed, the Examiner is necessarily relying on the implicit, although unstated, contention that a composite dielectric material layer, comprising a reaction product of the high-K dielectric material and the standard-K dielectric material, is *inherently* present in the structure of Ma et al. This, too, is clearly erroneous and legally incorrect.

An inherent disclosure is a disclosure that is necessarily contained in the prior art, and would be so recognized by a person of ordinary skill in that art. *See, e.g., Continental Can Co. USA, Inc. v. Monsanto Co.*, 20 USPQ2d 1746, 1749-50 (Fed. Cir. 1991). "Inherency" charges the inventor with knowledge that would be known to the art, although not described in the disclosure relied upon or referred to. Inherency is not a matter of hindsight based on the applicant's disclosure: the missing claim elements must necessarily be present in the prior art. *In re Schreiber*, 44 USPQ2d 1429, 1435 (Fed. Cir. 1997).

Under the law of inherency, there are two flaws in any contention that Applicants' claimed composite is inherently present in the device of Ma et al. First, in order to be inherent, the disclosure missing from the reference must necessarily be present. Second, such presence must be recognized by those of skill in the art. In the present case, neither criteria is met.

First, Ma et al. disclose annealing at temperatures ranging from 400°C to 900°C (col. 7, lines 23-25). A substantial portion of this range would be insufficient to form the composite disclosed and claimed by Applicants. Applicants disclose, at page 21, lines 25-28, that annealing temperatures in the range from about 700°C to about 1150°C are used in causing the composite-forming reaction to take place. Thus, at best, the process of Ma et al. *might possibly* cause a reaction to take place between the high-K and standard-K materials to form a composite dielectric material, as claimed. It is well established that probabilities or possibilities are insufficient to prove inherency. The

mere fact that a certain thing may result from a given set of circumstances is not sufficient. *Id.* at 1749. Because the conditions disclosed by Ma et al. would not necessarily form the composite, there can be no inherently present composite dielectric material necessarily resulting from the process of Ma et al. For this reason alone, the rejection is without proper basis and should be withdrawn.

Second, in order for the Examiner to rely on the inherent presence of the missing subject matter, the Examiner must show that persons of ordinary skill in the art would recognize the presence of the missing subject matter. *Id.* at 1749. The Examiner has not even contended that the missing subject matter would be recognized by those of ordinary skill in the art. Thus, the Examiner failed to show this essential element of inherency. For this reason alone, the rejection is without proper basis and should be withdrawn.

Information Disclosure Statement

In the Office Action, the Examiner stated that the two non-patent references cited in Applicants' original Information Disclosure Statement were not considered because they were not submitted. As clearly set forth in 37 CFR 1.98(d), Applicants are not required to submit copies of these two references, since they were submitted with Applicants' IDS in the parent application, to which this application claims priority under 35 U.S.C. 120. Accordingly, the Examiner is respectfully referred to the parent application for these references.

Applicants respectfully request the Examiner to consider these two references, which can be found in the parent file wrapper, and to provide an initialed copy of Applicants' form PTO-1449 indicating such consideration.

CONCLUSION

For the foregoing reasons, Applicants respectfully submit that all of the presently pending claims patentably distinguish over the prior art generally, and over Ma et al. in

particular, and that all of Applicants' claims are therefore in condition for allowance. Applicants request the Examiner to so indicate.

If the Examiner considers that a telephone interview would be helpful to facilitate favorable prosecution of this application, the Examiner is invited to telephone the undersigned.

No additional claims fees are believed due for the filing of this paper. However, if a fee is required, please charge the fee to Deposit Account No. 18-0988, Order No. G0533A.

Respectfully submitted,
RENNER, OTTO, BOISSELLE & SKLAR, LLP

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Thomas W. Adams, Reg. No. 35,047

1621 Euclid Avenue
Nineteenth Floor
Cleveland, Ohio 44115
Ph: (216) 621-1113
Fax: (216)621-6165

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